CLAIMS

1. A method of determining an optimal fusion current for fusion splicing ends of two optical fibers to each other using an electric discharge between two electrodes, **characterized by** the steps of:

- determining optimal parameters including an optimal current for fusion splicing ends of test optical fibers of a first kind to each other in first ambient conditions,
- determining a value of a calibration light intensity for light emitted from the ends of the test optical fibers when splicing them using the optimal parameters in the first ambient conditions,
- in second ambient conditions, determining a value of the current required to heat a piece of the test optical fibers to emit light of an intensity agreeing with the calibration light intensity,
- calculating a proportional change be mathematically dividing the value of the heating current by the optimal current in the first ambient conditions,
- calculating, for optical fibers of a second kind different from the first kind, a fusion current to be used in splicing ends of optical fibers of the second kind in the second ambient conditions, by modifying, by the calculated proportional change, an optimal fusion current used for splicing optical fibers of the second kind in the first ambient condition.

2. A method according to claim 1, **characterized in** that in determining the light intensity an average of the intensity of light emitted from a predetermined region at the splicing position is calculated.

3. A method according to any of claims 1 - 2, **characterized in** that in the splicing and heating processes pictures are captured of the splicing position and analyzed.

4. A device for determining a fusion current to be used in splicing ends of two optical fibers to each other by means of an electric discharge, comprising

- electrodes for forming an electric discharge therebetween,
- driver circuits connected to the electrodes for applying a high voltage therebetween and making a heating current pass between the electrodes in the electric discharge,
- retaining and positioning holders for retaining ends of two optical fibers and for placing the fiber ends, with end surfaces at each other or in abutting relationship with each other, in a splicing position between points of the electrodes and in the electric discharge,

characterized by

- a measuring assembly for measuring the intensity of light emitted from ends of two optical fibers retained by the retaining and positioning holders,
- first calculating circuits connected to the measuring assembly and the driver circuits, the control circuits arranged to calculate a proportional change from a calibration fusion current and a heating

current,

- a memory connected to the measuring assembly and the calculation circuits for storing a calibration light intensity and a calibration fusion current for test optical fibers, a value of the proportional change calculated by the first calculating circuits, and fusion splicing parameters including a fusion current for at least one optical fiber type different from that of the test optical fibers, and
- second calculating circuits, connected to the memory, for calculating an optimal value of a fusion current, for fusion splicing ends of two optical fibers of the different type, from the fusion current stored for the different optical fiber type, by modifying by the stored proportional change.

5. A device according to claim 4, **characterized in** that the measuring assembly includes a camera for capturing pictures of the splicing position, the first calculating circuits means arranged to determine the light intensity as an average light intensity from a predetermined field in a captured picture.

6. A method of controlling, in fusion splicing ends of two optical fibers to each other using an electric discharge between two electrodes, a fusion current passing between the two electrodes, **characterized by** the steps of:

- determining optimal parameters including a value of an optimal current for fusion splicing ends of test optical fibers of a first kind to each other in first ambient conditions,
- determining a value of a calibration light intensity for light emitted from the ends of the test optical fibers when fusion splicing them using the optimal parameters in the first ambient conditions,
- in second ambient conditions, determining a value of the current required to heat a piece of the test optical fibers or of an optical fiber of the same kind as the test optical fibers to emit light of an intensity agreeing with the calibration light intensity,
- calculating a proportional change by mathematically dividing the value of the current required for heating by the value of the optimal current in the first ambient conditions,
- calculating, for optical fibers of a second kind different from the first kind, a value of a fusion current to be used in fusion splicing ends of two optical fibers of the second kind to each other, by modifying, by the calculated proportional change, a fusion current used for optical fibers of the second kind in the first ambient conditions, and
- controlling the fusion current used in fusion splicing ends of two optical fibers of the second kind to each other to take the calculated value.

7. A method according to claim 6, **characterized in** that in determining the light intensity an average of the intensity of light emitted from a predetermined region at the splicing position is calculated.

8. A method according to any of claims 6 - 7, **characterized in** that in the splicing and heating processes pictures are captured of the splicing position and analyzed.

9. A device for controlling, in splicing ends of two optical fibers to each other by means of an electric discharge, a fusion current passing in the electric discharge, comprising

- electrodes for forming an electric discharge therebetween,
- driver circuits connected to the electrodes for applying a high voltage therebetween and making a heating current pass between the electrodes in the electric discharge,
- retaining and positioning holders for retaining ends of two optical fibers and for placing the fiber ends, with end surfaces at each other or in abutting relationship with each other, in a splicing position between points of the electrodes and in the electric discharge,

characterized by

- a measuring assembly for measuring the intensity of light emitted from ends of two optical fibers retained by the retaining and positioning holders,
- first calculating circuits, connected to the measuring assembly and the driver circuits, for calculating a proportional change from a calibration fusion current and a heating current,
- a memory connected to the measuring assembly and the first calculation circuits for storing a calibration light intensity and a calibration fusion current for test optical fibers, a proportional change, calculated by the first calculating circuits, and fusion splicing parameters including a fusion current for at least one optical fiber type different from that of the test optical fibers,
- second calculating circuits, connected to the memory, for calculating a value of a fusion current from the fusion current stored for the different optical fiber type, by modifying it by the stored proportional change, and
- control circuits connected to the second calculating circuits and the driver circuits for controlling the driver circuits to make a heating current pass between the electrodes, for fusion splicing ends of two optical fibers of the different type, the heating current having the value calculated by the second calculating circuits.

10. A device according to claim 9, **characterized in** that the measuring assembly includes a camera for capturing pictures of the splicing position, the first calculating circuits arranged to determine the light intensity as an average light intensity from a predetermined field in a captured picture.

11. A method of fusion splicing ends of two optical fibers to each other using an electric discharge between two electrodes, a fusion current passing between the two electrodes, **characterized by** the steps of:

- determining optimal parameters including a value of an optimal current for fusion splicing ends

of test optical fibers to each other in first ambient conditions,

- determining a value of a calibration light intensity for light emitted from the ends of the test optical fibers when fusion splicing them using the optimal parameters in the first ambient conditions,

- in second ambient conditions, determining a value of the current required to heat a piece of the test optical fibers or of an optical fiber of the same kind as the test optical fibers to emit light of an intensity agreeing with the calibration light intensity,

- calculating a proportional change by mathematically dividing the value of the current required for heating by the value of the optimal current in the first ambient conditions,

- calculating, for the optical fibers to be fusion spliced to each other a value of a fusion current to be used in the fusion splicing, by modifying, by the calculated proportional change, a fusion current used for optical fibers to be fusion spliced to each other in the first ambient conditions, and

- controlling the fusion current used in the fusion splicing of the ends of the two optical fibers to each other to take the calculated value.

12. A method according to claim 11, **characterized in** that in determining the light intensity an average of the intensity of light emitted from a predetermined region at the splicing position is calculated.

13. A method according to any of claims 11 - 12, **characterized in** that in the fusion splicing and heating processes pictures are captured of the splicing position and analyzed.

14. A device for splicing ends of two optical fibers to each other by heating in an electric discharge, a fusion current passing in the electric discharge, comprising

- electrodes for forming an electric discharge therebetween,

- driver circuits connected to the electrodes for applying a high voltage therebetween and making a heating current pass between the electrodes in the electric discharge,

- retaining and positioning holders for retaining ends of two optical fibers and for placing the ends, with end surfaces at each other or in abutting relationship with each other, in a splicing position between points of the electrodes and in the electric discharge,

characterized by

- a measuring assembly for measuring the intensity of light emitted from ends of two optical fibers retained by the retaining and positioning holders,

- first calculating circuits, connected to the measuring assembly and the driver circuits, for calculating a proportional change from a calibration fusion current and a heating current,

- a memory connected to the measuring assembly and the first calculation circuits for storing a calibration light intensity and a calibration fusion current for test optical fibers, a proportional

change, calculated by the first calculating circuits, and fusion splicing parameters including a fusion current for the optical fibers to be fusion spliced to each other,

- second calculating circuits, connected to the memory, for calculating a value of a fusion current from the fusion current stored for the optical fibers to be fusion spliced to each other, by modifying it by the stored proportional change, and

- control circuits connected to the second calculating circuits and the driver circuits for controlling the driver circuits to make a heating current pass between the electrodes, for fusion splicing ends of the two optical fibers to be fusion spliced to each other, the heating current having the value calculated by the second calculating circuits.

15. A device according to claim 14, **characterized in** that the measuring assembly includes a camera for capturing pictures of the splicing position, the first calculating circuits arranged to determine the light intensity as an average light intensity from a predetermined field in a captured picture.